

For each of the following problems provide a formula and concluding statement with your solution.

1. A radioactive substance has a half-life of 5 days. Suppose you have 70 g of this substance now.
 - a. Write an equation to represent the mass of the substance, y (in grams), after “ x ” half-lives.
 - b. Calculate the mass of the substance 30 days from now?
2. A photocopier sells for \$12000. Each year it depreciates, or decreases in value, by 15%.
 - a. Determine the decay factor, “ b ”.
 - b. Write an equation to represent the value, y (in dollars), of the photocopier when it is “ n ” years old.
 - c. Find the value of the machine when it is 5 years old.
3. Blue jeans fade with repeated washing. Suppose a pair of jeans loses 2% of its colour after each wash.
 - a. Write an equation to represent the percent of colour, y , after x washings.
 - b. How much of the original colour is left after 50 washings?
4. Caffeine, found in pop, coffee, and tea, travels to your bloodstream after you consume it. After you drink a beverage that contains caffeine, 13% of the caffeine in your blood is removed every hour.
 - a. Write an equation to represent the percent of caffeine, y , that remains in your bloodstream x hours after you drink a can of pop.
 - b. What percent of the original amount of caffeine is left in your bloodstream 4 hours after you drink a can of pop?
 - c. Create a graph of this relationship with the Percent of Caffeine Remaining on the y -axis and the Time in hours on the x -axis. Your x -scale should go from 0 – 6 hours by increments of 30 minutes.
 - d. After approximately how much time does one-half of the original amount of caffeine still remain in your body. (**Hint: This would then be the half-life of caffeine**)
5. A new car decrease in value exponentially after it is purchased. The value, V (in dollars), of a new car “ n ” years after it is purchased is given by the equation $V = 20000(0.84)^n$.
 - a. What was the purchase price of the car?
 - b. By what percent does the value of the car decrease each year?
 - c. Find the value of the car 6 years after it was purchased?